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| Name: | <i>Fire Protection Systems</i> |
| Course Description: | This course provides information relating to the features of design and operation of fire alarm systems, water-based fire suppression systems, special hazard fire suppression systems, water supply for fire protection and portable fire extinguishers. |
| Prerequisite: | High School algebra and FESHE core courses or equivalent |
| Outcomes: | <ol style="list-style-type: none"> 1. Explain the benefits of fire protection systems in various types of structures 2. Describe the basic elements of a public water supply system including sources, distribution networks, piping and hydrants. 3. Explain why water is a widely used extinguishing agent and describe how water extinguishes fires. 4. Identify the different types and components of sprinkler, standpipe and foam systems. 5. Define the benefits of residential sprinkler legislation. 6. Identify five different types of non-water based fire suppression systems and describe how these systems extinguish fire. 7. Describe the basic components of a fire alarm system. 8. Identify three different types of detectors and explain how they detect fire. 9. Describe the hazards of smoke and list the four factors that can influence smoke movement in a building. 10. Recognize the appropriate application of the different types of sprinklers. 11. Explain the operation and appropriate application for the different types of portable fire extinguishing systems. 12. Identify and analyze the causes involved in the line of duty firefighter deaths related to structural and wildland firefighting, training and research and the reduction of emergency risks and accidents |

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| Suggested Student Texts: | <p><i>Automatic Sprinkler and Standpipe Systems</i>; John L. Bryan, NFPA 1990</p> <p><i>Design of Special Hazard and Fire Alarm System</i>; Robert Gagnon, Thomson 1997</p> <p><i>Design of Water Based Fire Protection Systems</i>; Robert Gagnon, Thomson 1996</p> <p><i>Fire Protection Handbook</i>, NFPA</p> <p><i>Fire Suppression and Detection Systems</i>; John Bryan, MacMillan Publishing</p> <p><i>Operation of Fire Protection Systems</i>; NFPA 1981</p> <p><i>Private Fire Protection and Detection</i>; Fire Protection Publication 2001</p> |
| Supporting References/Research for Faculty and Students: | <p>U.S. Fire Administration</p> <p>Publications: http://www.usfa.fema.gov/applications/publications</p> <p>See Fire Protection, Fire Service Operations</p> <p>Applied Research:</p> <p>http://www.usfa.fema.gov</p> <p>Research Reports:</p> <p>http://www.usfa.fema.gov/research</p> <p>Technical Reports:</p> <p>http://www.usfa.fema.gov/applications/publications/browse.cfm?mc=29</p> <p>Topical Fire Research Series:</p> <p>http://www.usfa.fema.gov</p> <p>Learning Resource Center:</p> <p>http://www.lrc.fema.gov</p> <p>National Institute for Standards and Technology</p> <p>http://www.fire.nist.gov: Fire Tests/Data, Software/Models, Publications, FIREDOC (under Publications)</p> |
| Supporting References/Research for Faculty and Students: | <p>References</p> <p>Lessons Learned Information Sharing:</p> <p>http://www.llis.dhs.gov/member/secure/index.cfm</p> <p>http://www.homefiresprinkler.org</p> <p>Society of Fire Protection Engineers:</p> <p>http://www.pentoncmg.com/sfpe/index.html</p> <p>Current Events/News</p> <p>http://www.firehouse.com</p> <p>http://www.fireengineering.com</p> <p>http://www.withthecommand.com</p> |
| Assessment: | Students will be evaluated for mastery of learning objectives by methods of evaluation to be determined by the instructor. |
| Points of Contact: | <p>Terry Koeper, Crafton Hills College, California, (909) 389-3261, tkoeper@craftonhills.edu</p> <p>Judith Kuleta, Bellevue Community College, Washington, (425)564-2515, jkuleta@bcc.ctc.edu</p> <p>Revision 11/05</p> |

Course Outline

Fire Protection Systems

- I. Introduction to Fire Protection Systems
 - A. The role fire protection systems play in protecting the life, safety and welfare of the general public and firefighters
 - B. Overview of the different types of fire protection systems
 - C. The role of codes & standards in fire protection system design
- II. Water Supply Systems for Fire Protection Systems
 - A. Sources of fire protection water supply
 - B. Distribution networks
 - C. Piping
 - D. Hydrants
 - E. Utility company interface with the fire department
- III. Water-based fire suppression systems
 - A. Properties of water
 - 1. Water as an effective extinguishing agent
 - 2. How water extinguishes fire
 - B. Sprinkler Systems
 - 1. Types of systems & applications
 - 2. Types of sprinklers & applications
 - 3. Piping, valves, hangers & alarm devices
 - 4. Fire department operations in buildings with sprinkler systems
 - C. Residential sprinkler systems
 - D. Standpipe systems
 - 1. Types & applications
 - 2. Fire department operations in buildings with standpipes
 - E. Foam systems
 - F. Water mist systems
 - G. Fire pumps
 - 1. Types
 - 2. Components
 - 3. Operation
 - 4. Fire pump curves
- IV. Non-water-based fire suppression systems
 - A. Carbon dioxide systems
 - 1. Applications
 - 2. Extinguishing properties
 - 3. System components
 - B. Halogenated systems
 - 1. Halon 1301 and the environment
 - 2. Halon alternatives
 - 3. Extinguishing properties
 - 4. System components
 - C. Dry/Wet Chemical Extinguishing systems
 - 1. Extinguishing properties
 - 2. Applications

3. UL 300

- V. Fire alarm systems
 - A. Components
 - B. Types of fire alarm systems
 - C. Detectors
 - 1. Smoke
 - 2. Heat
 - 3. Flame
 - D. Audible/visual devices
 - E. Alarm monitoring
 - F. Testing & maintenance of fire alarm systems
- VI. Smoke management systems
 - A. Hazards of smoke
 - B. Smoke movement in buildings
 - C. Types of smoke management systems
 - D. Firefighter operations in buildings with smoke management systems
- VII. Portable fire extinguishers
 - A. Types & applications
 - B. Selection
 - C. Placement
 - D. Maintenance
 - E. Portable fire extinguisher operations